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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/725,081

11/29/2000

Atsushi Umeda

PM 275902  
54818-US-SUS/nh

7497

7590

04/01/2002

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EXAMINER

CUEVAS, PEDRO J

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 04/01/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/725,081

Applicant(s)

UMEDA ET AL.

Examiner

Pedro J. Cuevas

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 February 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4, 6 and 7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-4, 6 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. The equation " $n \geq 2 p \times m$ " in claim 1 is missing mathematical operators which renders the claim indefinite. The term " $n \geq 2 p \times m$ " is not properly defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. As the examiner understands, the claim language is describing a different equation.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,739,204 to Kitamura et al. in view of U.S. Patent No. 5,965,965 to Umeda et al., further in view of U.S. Patent No. 6,137,201 to Umeda et al.

Kitamura et al. discloses a liquid-cooled vehicle rotary electric machine (Figure 2) operable in a motor mode or a generator mode comprising:

a frame (26, 30) having an inner periphery and a liquid passage (32);  
a stator core (10) having an outer periphery fixedly fitted to said inner periphery of said frame and a plurality of slots;  
a multi-phase stator winding (11) accommodated in said plurality of slots; and  
a rotor (21) rotatably supported by said frame and disposed inside said stator core so as to electro-magnetically connect said stator core.

However, it fails to disclose a liquid-cooled vehicle rotary electric machine wherein:

said stator winding comprises a plurality of insulated U-shaped conductor segments each of which has a pair of legs;

each of said legs is inserted in a slot from one end of said stator core and connected to be paired to another at a portion extending from the other end of said stator;

said rotor has a plurality (P) of magnetic poles alternately disposed at prescribed intervals in the circumferential direction thereof;

said plurality of slots is disposed in said stator to increase contact area of said U-shaped conductor segments with slot inner walls ; and

the number (n) of said slots is equal or larger than two times as many as the product of the number (p) of said magnetic poles and the number (m) of the phase of said stator, that is  $n \geq 2 p \times m$ .

Umeda et al. (5,965,965) teaches the construction of a vehicle rotary electric machine wherein:

a stator winding (8) comprises a plurality of insulated U-shaped conductor segments (33) each of which has a pair of legs (33);

each of said legs is inserted in a slot from one end of stator core (2) and connected to be paired to another at a portion extending from the other end of said stator;

said rotor has a plurality (P) of magnetic poles alternately disposed at prescribed intervals in the circumferential direction thereof as stated in lines 34-54 of column 3; and

the number (n) of said slots is larger (in this case 96), than two times as many as the product of the number (p) of said magnetic poles and the number (m) of the phase of said stator, that is  $n \geq 2 p \times m$ ;

for the purpose of providing an improved structure of coil ends of the stator and rotor which provides high cooling performance with low noise, and does not require the addition of any parts.

Umeda et al. (6,137,201) teaches the construction of a vehicle rotary electric machine wherein:

said plurality of slots is disposed in said stator to increase contact area of said U-shaped conductor segments with slot inner walls.

It would have been obvious to one skilled in the art at the time the invention was made to use the insulated U-shaped conductor segments filled with insulating material, the rotor with 96 slots, and the stator slot disposition disclosed by Umeda et al. on the liquid-cooled vehicle rotary electric machine disclosed by Kitamura et al. for the purpose of providing an improved structure of coil ends of the stator and rotor which provides high cooling performance with low noise, and does not require the addition of any parts; and providing insulation to the coils.

6. With regards to claim 2, Umeda et al. (6,137,201) discloses the construction of a liquid-cooled rotary electric machine having a space factor more than 55 %, wherein each of said

U-shaped conductor segments comprises a flat wire as stated in lines 52 and 53 of column 2, for the purpose of providing an AC generator for vehicles capable of preventing stoppage of the generator due to a short-circuit within a stator slot.

It would have been obvious to one skilled in the art at the time the invention was made to use the liquid-cooled rotary electric machine disclosed by Umeda et al. on the liquid-cooled vehicle rotary electric machine disclosed by Kitamura et al. in view of Umeda et al. for the purpose of providing an AC generator for vehicles capable of preventing stoppage of the generator due to a short-circuit within a stator slot.

7. With regards to claim 3, Kitamura et al. discloses a liquid-cooled vehicle rotary electric machine wherein said stator core and said stator winding are liquid-tightly enclosed by said frame (26, 30) as shown in Figure 2, and stated in line 61 of column 2.

8. With regards to claim 4, Umeda et al. (5,965,965) discloses a liquid-cooled rotary electric machine wherein each of said legs inserted in said plurality of slots is closely fitted to one of said plurality of slot via an insulator (34) for the purpose of providing insulation to the coils.

9. With regards to claim 6, Umeda et al. (5,965,965) discloses a liquid-cooled rotary electric machine wherein said stator winding has a plurality of coil ends (33d) formed of said U-shaped conductor segments separated from each other, each of said coil ends is covered by and filled with insulating material (34), and said insulating material is closely fitted to said frame for the purpose of providing insulation to the coils.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,739,204 to Kitamura et al. in view of U.S. Patent No. 5,965,965 to Umeda et al., further in

view of U.S. Patent No. 6,137,201 to Umeda et al. as applied to claims 1-4 and 6 above, and further in view of Electric Machinery and Transformers, 2<sup>nd</sup> Ed. to Guru et al..

According to Guru et al. the stator winding current required by any electromechanical device is larger when used as a motor, than the stator winding current supplied by the device when used as a generator, due to the losses of the magnetic circuit.

***Response to Arguments***

11. Applicant's arguments filed February 6, 2002 have been fully considered but they are not persuasive.

12. In response to applicant's argument that Kitamura is completely devoid of disclosing that the number of the slots is larger than the product of the number of the magnetic poles of the and the number of the phases of the stator, this limitation has been addressed by the Umeda et al. patent (5,965,965).

13. In response to applicant's argument that Kitamura does not disclose the use of an extra-many slots stator structure to increase the contact area of the n-slot portion of the conductor segment with the slot's inner wall so that the heat dissipation of the conductor segments can be enhanced more, this limitation has been addressed by the Umeda et al. patent (6,137,201).

***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pedro J. Cuevas whose telephone number is (703) 308-4904. The examiner can normally be reached on M-T from 7:30 - 5:00; F from 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Néstor R. Ramírez can be reached on (703) 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-1341 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Pedro J. Cuevas  
March 21, 2002

  
BURTON S. MULLINS  
PRIMARY EXAMINER